DOCUMENT RESUME

ED 201 925 CG 015 151

AUTHOR Terris, William; Jones, John W.
TITLE Reducing Shrinkage in Convenience Stores by the Use of the PSI.
PUB DATE [80]
NOTE 20p.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Crime; Employee Responsibility; *Employment Problems; Job Performance; Personnel Data; Personnel Selection; *Polygraphs; *Predictive Validity; *Prevention; Sales Workers; *Screening Tests; *Stealing
IDENTIFIERS *Personnel Selection Inventory

ABSTRACT

This bibliography contains over 1,200 behavioral and property is a rapidly growing problem. Successful strategies are needed to reduce employee theft; new loss prevention techniques need to be developed and evaluated. Two loss prevention programs aimed at reducing employees' theft were compared by the measures of shrinkage rates. Initially, a pre-employment polygraph examination was used to screen out job applicants with a past history of theft. In this first phase a 17-month baseline on shrinkage was obtained. Next, the Personnel Selection Inventory (PSI), a psychological test measuring tendencies toward dishonesty, violence and drug abuse, was administered for a 6-month period in conjunction with the polygraph, but the PSI results were not used for screening purposes. Finally, only the PSI was used to screen all job applicants. Results of the PSI significantly correlated with the result of the pre-employment polygraph examination, and the use of the PSI alone resulted in a significant reduction in losses for the stores. An additional study with 850 applicants from a different convenience store chain showed that the use of the PSI had no adverse impact upon any protected group. (Author/NRB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED201925

Reducing Shrinkage in Convenience Stores by the Use of the PSI

William Terris and John W. Jones

DePaul University

CG 015151

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

John W. Jones

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Reducing Shrinkage in Convenience Stores by the Use of the PSI

Employees' theft of money, merchandise and property for businesses is a common and rapidly growing problem in the United States (AMA, 1977; U.S. Department of Commerce, 1972). Goode (1978) noted that employee theft, fraud and embezzlement imposes a greater financial burden on the public and taxpayers than robberies and burglaries. Jaspan (1968) estimated that employee theft costs businesses $5 million a day. Morgenstern (1977) estimated that at least 30 percent of all business failures each year are due to employee theft and dishonesty. Civiletti (1977) has reported that Federal banks lose three times as much from white-collar crime as from armed robberies. Similar statistics could be cited for many other industries and businesses.

Successful strategies are needed to reduce employee theft. The principal methods currently used are television monitoring devices for detection of theft activities, frequent patrols by security officers and undercover agents, and random polygraph examinations to inhibit workers from stealing (Ash, 1973; Harris, 1976). Unfortunately, neither apprehension and punishment nor on the job security devices seem to have a reliable deterrent effect on employee theft (Ash, 1973; Faltenmayer, 1970). Other loss prevention techniques need to be developed and evaluated.

The pre-employment polygraph examination is becoming widely used in many industries to screen employees for a history of theft as well as other types of criminal histories (Levine, 1979). While the need for some type of screening program is clear there are definite problems with pre-employment polygraph examinations. While many companies report that pre-employment polygraph screening has reduced their losses, it is uncertain

as to why this reduction has occurred. From an experimental point of view, the reduction in losses could be due to a large number of variables which are usually part of or confounded with the introduction of the polygraph. A more practical problem is that the quality of polygraph instruction varies greatly from one area of the country to another. The reliability and validity of polygraph examinations have been found to vary as a function of the particular polygraphist (Ash, 1976; Dearman & Smith, 1963). In addition, the pre-employment polygraph examination has not been standardized and for a substantial number of examiners recommendations can often be based on their biases and prejudices (Levine, 1979). A properly conducted pre-employment polygraph examination takes a great deal of time and is therefore very costly. Finally, many states have passed laws restricting or outlawing the use of the polygraph in pre-employment situations and many people believe a federal law against polygraph will be passed shortly (Levine, 1979).

A new deterrant of employee theft that is starting to receive much scientific attention is the use of psychological tests on job applicants to screen out those who, if hired, might steal at work (e.g., Ash, 1971, 1973, 1976; Terris, 1979). In one study Terris (1979) found that job applicants for positions of trust who made employee theft admissions in a polygraph examination scored reliably higher on the dishonesty scale of the Personnel Selection Inventory (PSI) (London House Management Consultants, 1977) than did applicants who made little or no theft admissions. The PSI dishonesty scale measures job applicants' attitudes, values, opinions and perceptions about theft. Job applicants most likely to engage in theft at work were more tolerant of and less punitive toward theft than were honest employees. Dishonest employees also engaged in common rationalizations

for their theft, typically seeing themselves as "average" people in a basically dishonest world. The PSI dishonesty scale has significantly correlated with admissions of employees' theft in a series of published validation studies (Jones, 1980a, b; Terris, 1979, 1980; Terris & Jones, 1980). These correlations typically ranged from .4 to .8.

The purpose of this quasi-experimental (cf. Campbell & Stanley, 1963) study was to determine the effect of changing from a loss prevention program based upon the pre-employment polygraph examination to a similar program based on psychological testing using the PSI. Theft reduction in a district of convenience stores was studied. The National Association of Convenience Stores recently commissioned an Industry-wide study of 34,000 stores in 1979 and estimated that 75% of theft in the convenience store industry is from employees (SRI International, 1980). Moreover, the major portion of inventory shrink in convenience stores resulted from theft by employees and inventory shrink in 1978 was estimated to be over $100 million (SRI International, 1980).

Method

Business Sample

An entire district of convenience stores from a nationwide chain participated in this study. This district expanded from 20 to 26 stores during the course of this study. It had over $5 million in sales for the 1978-79 fiscal year, over $7 million in sales for the 1979-80 fiscal year, and over $2 million in sales four months into the 1980-81 fiscal year.

Quasi-experimental Design and Statistical Analyses

A time series quasi-experimental design was used (Campbell & Stanley, 1963). Three phases were delimited for between-phase comparisons. Reliable data on shrinkage losses before the implementation of any loss

prevention programs were not available.

Phase A. Phase A served as baseline. It consisted of shrinkage rates for each of 17 months ranging from March of fiscal year 1978-79 through July of fiscal year 1979-80. All pre-employment screening during Phase A was done with polygraph.

Phase B. Phase B covered six months ranging from August of fiscal year 1979-80 through January of the same fiscal year. During Phase B pre-employment polygraph examinations were still given to applicants and were used to make a hiring decision. However a sample of applicants (N = 28) also completed the PSI during this phase even though these scores were not used for hiring purposes. Clark and Hollinger (1979) have found that work organizations which exhibited a climate of concern regarding employee theft generally had lower levels of such crime. Thus, Phase B served as a control for job applicants' possible reduction in theft due to increased perceptions of organizational concern over employee crime. This increased perception of concern might have occured as a function of having to take both the polygraph and the PSI.

Phase C. In Phase C the PSI completely replaced the polygraph in pre-employment screening for dishonesty. This change took place during the last few days of January of fiscal year 1979-80. Therefore Phase C consisted of five months ranging from February, 1979-80, through June, 1980-81.

Analyses. The t-test was used on all between-phase comparisons of means. Statistically nonsignificant autocorrelations of lag 1 (i.e, correlating adjacent data points) on both dependent variables indicated no reliable serial dependency in the data. Thus independence of observations can be assumed and t-tests on time series data can be computed (cf., Kazdin, 1976).

Loss Prevention Programs

During Phases A and B all job applicants were given a standard pre-employment polygraph examination which covered areas of past theft of money and merchandise, convictions for crimes, illegal drug use and truthfulness concerning the answers on the application form. Most examinations were administered by three polygraphists and followed a predetermined form. All polygraphists reported all admissions made as well as their opinion of the truthfulness of the applicant in the selected areas. Company personnel from the convenience store would accept or reject an applicant based on the admissions and estimated truthfulness. For the purposes of this study, applicants judged to be suitable were considered to have passed the pre-employment polygraph screening procedure. All others were considered to have failed.

In Phase C of this study a shift was made from polygraph to the Personnel Selection Inventory (PSI) for all pre-employment screening (London House Management Consultants, 1977). The PSI includes items that measure attitudes toward theft (dishonesty scale), violence (violence scale) and drugs/alcohol (drug-abuse scale). Reliability coefficients for the dishonesty scale, the violence scale, and the drug-abuse scale equal .95, .87, and .90, respectively. Reliablity for the total test equals .96. Prior research has shown that the higher the scores on these three scales, the greater one's acceptance of, tolerance for, and propensity toward committing theft,engaging in violence, and using drugs and alcohol. A total composite integrity score based on all three subscales was used in making all hiring decisions. A cutoff score based upon past experience in other convenience stores was selected. The PSI and the pre-employment polygraph examination were each administered and scored independent of the

other.

Dependent Variables

Shrinkage per month (i.e., losses of money and merchandise) was the theft criterion for studying the efficacy of the PSI in reducing financial losses due to employees' theft. Researchers have estimated that major portions of company shrink are due to internal employee theft (e.g., Barefoot, 1979; Cole, 1980; Otis, 1977; Pomeranz, 1980). Using shrinkage as a dependent variable provides a nonobtrusive, nonreactive criterion measure that increases the external validity of this study.

Two measures of shrinkage were used in this study. The first was the district's total shrinkage in thousands of dollars per month. This measure was obtained by summing shrinkage across all stores in the district. The second was shrinkage each month as a percentage of total monthly district sales (i.e., (losses/sales) X 100). This latter measure controlled for the increase in the number of store units as well as increases in sales during the course of the study.

Results

Time Series Analyses

The results of this study are graphically presented in Figure 1. Both company losses in thousands of dollars and shrinkage as a percentage of sales are graphed in Figure 1 as a function of (a) month and (b) type of loss prevention program.

Insert Figure 1 Here

Inspection of Phase A in Figure 1 shows an average company loss of $11,193 per month (SD = $3,301). Over the 17 month baseline phase the

lowest monthly shrinkage loss was $6,027 and the highest was $17,185. The average shrinkage rate as a percentage of sales equaled 2.32% during Phase A (SD = .78%). The lowest percentage rate equaled 1.09% and the highest equaled 3.88%.

The average shrinkage losses in thousands of dollars in Phase B equaled $14,127 (SD =$3,824). Across this six month control phase losses ranged from a low of $6,816 to a high of $16,995. Shrinkage losses in thousands of dollars did not significantly differ between Phase A and Phase B on this variable ($t(21) = 1.8$, $p > .05$).

In Phase B shrinkage as a percentage of sales average 2.24% (SD = .61%). These percentage rates ranged from 1.09% to 2.77%. Again, the Phase A percentage rates did not reliably differ from the Phase B rates (t (21) = .27, $p > .20$).

In Phase C, monthly shrinkage losses in thousands of dollars were reduced to an average of $6,527 (SD = $2,984). These shrinkage losses rangedfrom a high of $11,710 following the first month of the implementation of the PSI loss prevention program to a low of $4,510. And these Phase C losses were significantly lower than losses accrued in both Phase A ($t(20) = 2.83$, $p < .02$) and Phase B ($t(9) = 3.6$, $p < .01$).

Also in Phase C monthly shrinkage rates as a percentage of sales averaged 1.05% (SD = .65%). Thse percentage rates ranged from a high of 2.19% following the first month of the PSI loss prevention program to .58%. Again, the Phase C percentage rates were significantly lower than both the Phase A ($t(20) = 3.33$, $p < .005$) and the Phase B ($t(9) = 3.12$, $p < .02$) rates.

PSI and Polygraph

During Phase B decisions to hire or not hire job applicants were made

solely on polygraph examination data. Since the PSI was also administered on a sample of applicants during this phase an opportunity to test the relationship of the PSI scores to the hiring decisions based on the polygraph exam existed. The job applicants' pass-fail status on the polygraph examination were compared and a significant relationship was found ($X^2(1)= 4.46$, $p < .05$). A phi-coefficient (Hays, 1973) equal to .40 indicated the degree of the interrelatedness. Inspection of the data revealed that 82% of the persons who passed the PSI also passed the polygraph. However only 59% of the applicants who failed the PSI also failed the polygraph examination. In other words the greatest inconsistency occurred when applicants failed the PSI. A full 41% of those failing the PSI did pass the polygraph.

Adverse Impact

The adverse impact of the PSI on protected groups was assessed using data obtained on job applicants applying for work in a similar national convenience store chain. The adverse impact of any psychological test used for pre-employment screening needs to be assessed (Equal Employment Opportunity Commission, 1979). This data is summarized in Table 1. A nonsignificant 4 (White, Black, Hispanic, "Other") X 2 (Pass, Fail) Chi-

---

Insert Table 1 Here

---

square analysis ($X^2(3) = .3$, $p > .50$) showed that the PSI had no adverse impact on any racial/ethnic group. And a significant 2 (Male, Female) X 2 (Pass, Fail) Chi-square analysis ($X^2(1) = 4.43$, $p < .05$) showed that females were not adversely discriminated against based on PSI scores.

Discussion

Two major findings occured in this study. First, the PSI scores derived in Phase B reliably correlated with the polygraph-based hiring decisions. This finding further validates the PSI as a predictor of job applicants' theft histories. Secondly, the PSI was reliably more effective than the polygraph examination in reducing shrinkage. For instance, a significant finding showed that shrinkage as a percentage of theft went from an average of 2.32% in Phase A (polygraph only) to an average of 1.05% in Phase C (PSI only). Since the district's sales were averaging $684,775 per month by the end of the study, choosing the PSI over the polygraph could save this one district approximately $104,000 a year. If this gain were realized with all stores in all of the districts, the savings nationwide would amount to approximately $3.5 million. Moreover, psychological testing is less expensive than the polygraph. A typical pre-employment polygraph examination costs anywhere from three to five times as much as an equivalent psychological test. Thus further savings could be realized.

There are many possible reasons for the increased efficacy of the PSI over the polygraph exam. The PSI is a highly reliable and valid psychological test for dishonesty while the reliability of the polygraph varies as a function of the polygraphist's skills. In the state where the study was conducted licensure for polygraphists is not required. State standards on the competency of the polygraphist can therefore not be required and maintained. Also the PSI assesses a job applicant's cognitive predisposition and propensity to steal even if he has never stolen, while the polygraph exam seeks to identify admissions of past theft. Therefore the polygraph examination could not identify the potential thief who never

stole while the PSI could. As Terris (1979) pointed out, "Young applicants with little or no job experiences may easily pass a pre-employment polygraph examination (i.e., they may never have taken money or merchandise from work simply because they have never worked!) but still be a potential thief" (p. 36). Finally, Chi-square analyses in Phase B revealed that the greatest disagreement between the PSI and the polygraph occurred when persons failed the PSI but passed the polygraph. Again this finding suggests that the PSI is capable of identifying job applicants as potential thieves even if they have never stolen. Although other reasons for these findings can be speculated, research is needed to both replicate these findings and to determine the reasons for the PSI's increased effectiveness over the polygraph in reducing shrinkage.

Based on the obtained results in the adverse impact study, the PSI appears to have no adverse impact on any protected group. Adverse impact guidelines are provided by the Equal Employment Opportunity Commission, (1979). Adverse impact is normally indicated when one selection rate is less than 80% of the other. However relatively small differences in selection rates may nevertheless constitute adverse impact if they are both statistically and practically significant.

In a recent review of research on dishonesty Farrington (1979) concluded that field experimentation with members of the work sector unwittingly participating as subjects is likely to have the greatest internal and external validity of any dishonesty research. Farrington found that most research on theft was either correlational and had low internal validity or else was conducted in a contrived, nonapplied experimental setting far removed from real life. The quasi-experimental design used in the present study serves as a bridge between correlational research on

theft and true applied experiments involving random allocation and behavioral measures. However two methodological points of concern in this study need to be discussed.

The major source of internal invalidity with the time series design is history effects. While all companies strive to improve profitability and reduce losses on a continuing basis, the authors are not aware of any changes in the company studied other than the implementation of the PSI program which could account for the reduction observed when the program was implemented. Thus the possibility of experimental confound due to history effects was lessened. Considering the design of this study, logically it would be expected that the elimination of polygraph screening should cause an increase in shrinkage. This would occur unless the PSI proved equally or more effective than the polygraph. The latter effect was found.

Too little work has been done to evaluate the effectiveness of any employee crime prevention program (cf., Cunningham & Nugent, 1978). It is important that loss prevention departments carefully document results of such programs, comparing losses before and after the program implementation using a time series design and monitoring possible history effects that can serve as experimental confounds. Since loss control is not a visible profit center, it must continually document its contribution to a company's gross profit. The present study documented the efficacy of the PSI over the polygraph in reducing employees' theft.

References and Reference Notes

American Management Association (AMA). Crimes against business project: Background, findings, and recommendations. New York: American Management Association, 1977.

Ash, P. Screening employment applicants for attitudes toward theft. Journal of Applied Psychology, 1971, 55, 161-164.

Ash, P. Attitudes of work applicants toward theft. Proceedings of the XVII International Congress of Applied Psychology, 1973, 590-591.

Ash P. The assessment of honesty in employment. SA Journal of Psychology, 1976, 6, 68-79.

Barefoot, J. Employee theft investigation. Moburn, MA: Butterworth Publishers, Inc., 1979.

Campbell, D. T., & Stanley, J. C. Experimental and quasi-experimental designs for research, Chicago: Rand McNally, 1963.

Civiletti, B. Problems posed by white-collar crime. Paper presented at the Annual National Meeting of the American Society for Industrial Security, Orlando, Florida, 1977.

Clark, J., & Hollinger, R. Theft by employees in work organizations: A preliminary final report. Minneapolis, Minnesota: University of Minnesota, Department of Sociology, 1979.

Cole, R. B. Principles and practice of protection. Springfield, IL.: Charles C. Thomas Co., 1980.

Cunningham, W., & Nugent, H. Economic crime: Literature analysis. McLean, VA.: Hallcrest Press, 1978.

Dearman, H., & Smith, B. Unconscious motivation and the polygraph test. The American Journal of Psychiatry, 1963, April/May, 1017-1020.

Equal Employment Opportunity Commission. Adoption of questions and answers to clarify and provide a common interpretation of the uniform guidelines on employee selection procedures. Federal Register, 1979, 44(43), 11996-12009.

Faltenmayer, E. Some here and now steps to cut crime. Fortune, 1970, 83, 94-97.

Farrington, D. P. Experiments on deviance with special reference to dishonesty. In L. Berkowitz's (Ed.), Advances in Experimental Social Psychology (Vol. 12), New York: Academic Press, 1979.

Goode, E. Property crimes. In E. Goode's (Ed.), Deviant behavior: An interactionist approach. Englewood Cliffs, NJ: Prentice Hall, 1978.

Harris, D. Managing people at work: Concepts and cases in interpersonal behavior. New York: Wiley/Hamilton Publications, 1976.

Hays, W. Statistics for the social sciences (2nd Ed.). New York: Holt, Rinehart, and Winston, Inc., 1973.

Jaspan, N. White collar thefts at $5 million a day. The National Underwriter, 1968, 76, 16.

Jones, J. W. Attitudinal correlates of employees' deviance: Theft, alcohol use, and nonprescribed drug use. Psychological Reports, 1980, 47, 71-77. a

Jones, J. W. Attitudinal correlates of employee theft of drugs and hospital supplies among nursing personnel. Nursing Research, 1980, in press.

Kazdin, A. Statistical analyses for single-case experimental designs. In M. Hersen and D. Barlow's (Eds.), Single case experimental designs: strategies for studying behavior change, New York: Pergamon Press, 1976.

Levine, E. L. Polygraph examination for pre-employment screening. Symposium presented at the annual National Meeting of the American Psycho-

logical Association, New York, 1979.

London House Management Consultants. The Personnel Selection Inventory (PSI). Park Ridge, Illinois: London House Press, 1977.

Morgenstern, D. Blue collar theft in business and industry. Springfield, VA: National Technical Information Service, 1977.

Otis, R. Organizing for retail loss prevention. Security World, 1977, 14 (4), 46-47, 64.

Pomeranz, F. Auditing developments. Journal of accounting, auditing and finance, 1980, 3(2), 178-184.

SRI International. The convenience store industry in the 1980's: A strategic outlook. Falls Church, VA: National Association of Convenience Stores, Inc., 1980.

Terris, W. Attitudinal correlates of employee integrity: Theft-related admissions made in pre-employment polygraph examinations. Journal of Security Administration, 1979, 2(1,2), 30-39.

Terris, W. Attitudinal correlates of theft, violence, and drug-use. Proceedings of the Seventeenth Interamerican Congress of Psychology, 1980, in press.

Terris, W., & Jones, J. W. Attitudinal and personality correlates of theft among supermarket employees. Journal of Security Administration, 1980, in press.

U.S. Department of Commerce. The economic impact of crimes against business. Washington, D.C., 1972.

Figure 1. Company shrinkage in terms of dollar losses and percent of sales as a function of time and treatment.

Footnotes

[1]Gratitude is extended to Dan Scruggs and the personnel within the convenience store district studied for their contributions in the data collection. Requests for reprints can be obtained from Dr. William Terris, Psychology Department, DePaul University, 2323 N. Seminary, Chicago, Illinois, 60614.

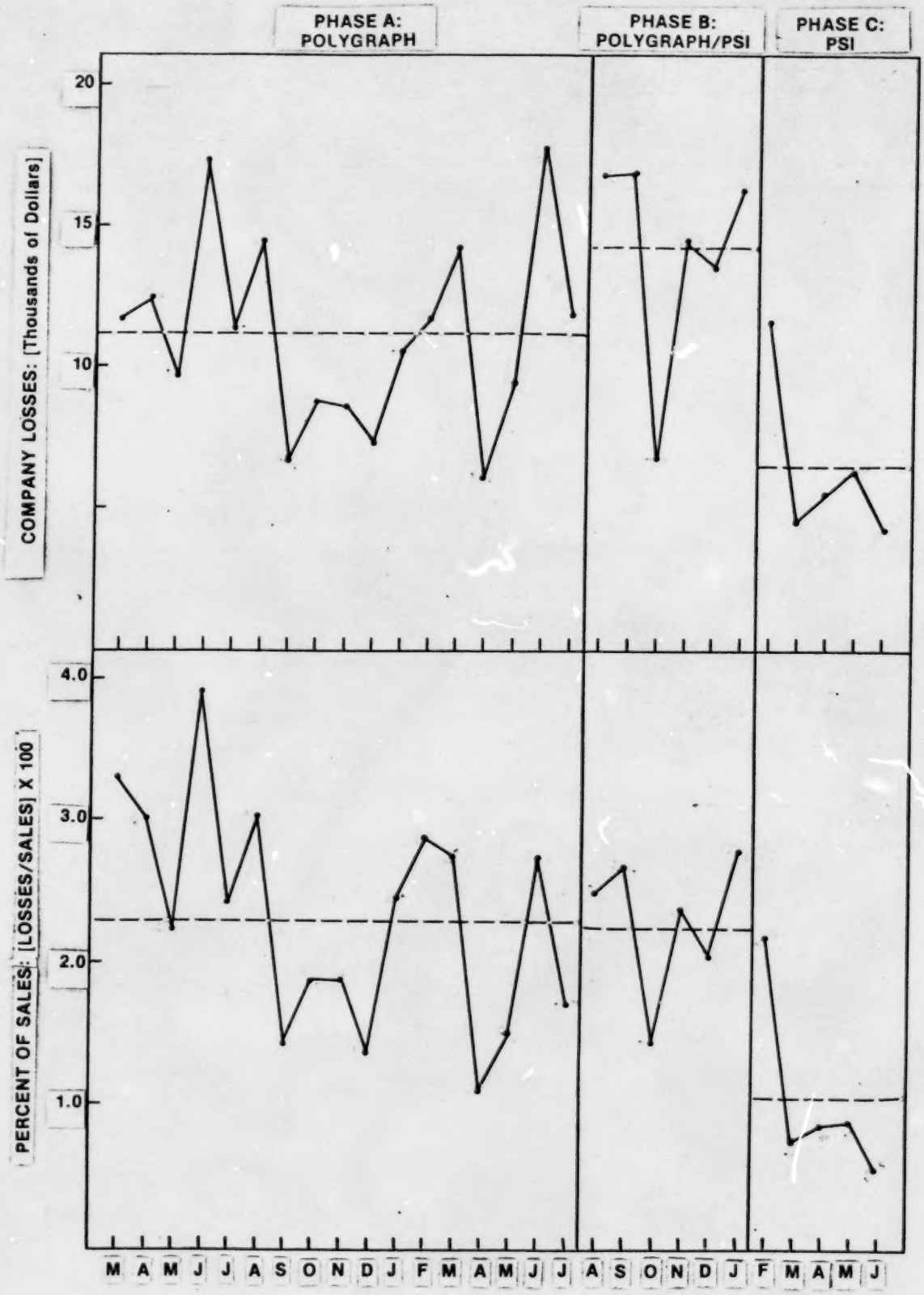
PHASE A: POLYGRAPH
PHASE B: POLYGRAPH/PSI
PHASE C: PSI
COMPANY LOSSES: [Thousands of Dollars]
20
15
10
PERCENT OF SALES: [LOSSES/SALES] X 100
4.0
3.0
2.0
1.0
M A M J J A S O N D J F M A M J J A S O N D J F M A M J
MONTH

Table 1

Summary of Adverse Impact Study

Applicants Meeting the Company's PSI Standards as a Function of Racial/Ethnic and Sex Categories

Groups (Racial-Ethnic and Sex)	Total Number	Percentage of Total Number*	Number Meeting The PSI Standards	Percentage Meeting Standards
White Applicants	629	77.1%	356	56.9%
Hispanic Applicants	97	11.9%	54	56.2%
Black Applicants	62	7.6%	35	56.4%
Other Groups (American Indian & Asian)	27	3.3%	14	51.8%
Minority Groups Combined	186	22.9%	103	55.4%
Applicants Refusing** To Identify Racial/ Ethnic Categories	38	4.5%	31	81.6%
Male Applicants	414	48.7%	223	53.9%
Female Applicants	436	51.3%	267	61.1%
TOTAL	850	----	490	56.5%

*Percentages for the various Racial/Ethnic groups and combinations are based upon the total number of applicants who identified their racial/ethnic group.

**As a group, people who refused to identify their racial/ethnic background did reliably better on the PSI. A sizable portion of these apparently were from the minority groups.